

REMARKS

In response to the above-identified Office Action, Applicants amend the application and seek reconsideration thereof. In this response, Applicants amend Claims 1, 3 and 5. Applicants do not cancel or add any claims. Accordingly, Claims 1-8 are pending.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "Version With Markings To Show Changes Made."

I. Claims Rejected Under 35 U.S.C. § 112

The Examiner rejects Claims 1-4 under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, the Examiner notes that Claims 1 and 3 recite a carbon material having an intensity ratio of less than 0.2, noting that the specification does not describe how the intensity ratio was attained. In addition, the Examiner refers to Cullity, Element of X-ray Diffraction, to show that intensity depends on wavelength and that this dependence should be kept in mind if an observed pattern is compared with known patterns made with a different wavelength.

In response, Applicants note that the cited portion of the Cullity reference indicates that the relative line intensities can be dependent upon each apparatus, noting that in the Debye-Scherrer camera that high-angle lines are stronger relative to low-angle lines than on a diffractometer recording. Applicants note that any such relative deviation from a normal measurement present on one plane (e.g., 002 or 110) would apply to the other planes as well, such that any deviation present in the numerator (e.g., first plane measurements) would also be present in the denominator (e.g., second plane measurements). Thus, any deviations seen both in the numerator and the denominator would be cancelled out such that the ratio recited in independent Claims 1 and 3 would be the same regardless of the device used to obtain the initial intensity measurement.

no wavelength
don't cancel

The Examiner rejects Claims 1-4 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

because diffraction angles have diff.
do it) At all angles, not same for all planes

Applicants regard as the invention. Specifically, the Examiner states that the recitation of an intensity ratio less than 0.2 in Claims 1 and 3 is relative and renders the claims indefinite since an intensity ratio less than 0.2 is not defined by the application. In response, Applicants note, similar to the discussion above regarding Claims 1-4 rejected under 35 U.S.C. 112, first paragraph, that one skilled in the art would appreciate that the intensity ratio recited in Claims 1 and 3 is device independent since any deviation between devices would be cancelled out due to the fact that the same deviation which occurs in measuring the first plane intensity would likewise be present in the measurement of the second plane intensity.

Accordingly, Applicants respectfully request withdrawal of the rejection of Claims 1-4 under 35 U.S.C. 112.

II. Claims Rejected Under 35 U.S.C. § 102(e)/103(a)

The Examiner rejects Claims 1-4 under 35 U.S.C. 102(e)/103(a) as being anticipated by and alternatively obvious over U.S. Patent No. 6,139,990 to Kubota, et al. ("Kubota"). Applicants amend independent Claims 1 and 3 to overcome the rejection.

Applicants first note that in order to anticipate a claim, the relied upon reference must disclose every limitation of the claims. Additionally, in order to render a claim obvious, the relied upon reference must teach or suggest every limitation of the claim such that the invention as a whole would have been obvious at the time the invention was made to one skilled in the art.

In maintaining the rejection, the Examiner relies on Kubota to show a graphite carbon material with an intensity ratio less than 0.04, noting that the method of preparation of the active material is irrelevant. In response, Applicants submit that Kubota does not teach or suggest all of the limitations of amended independent Claims 1 and 3. Specifically, Kubota fails to teach or suggest that the negative active material comprises heat-treated graphite carbon material. Rather, Kubota uses a method to modify scaly natural graphite by colliding the graphite particles with each other in a collision zone having opposing jet air streams in the collision zone, which is not the same as heat treating the graphite carbon material as recited in Applicants' amended independent Claims

1 and 3. Therefore, Applicants submit that at least this limitation is neither taught nor suggested by Kubota.

Accordingly, Applicants respectfully request withdrawal of the rejection of amended independent Claims 1 and 3. Claims 2 and 4 respectively depend from independent Claims 1 and 3 and are not anticipated or obvious at least for the same reasons.

The Examiner maintains the rejection of Claims 1-4 under 35 U.S.C. 102(e)/103(a) as being anticipated by and alternatively obvious over U.S. Patent No. 5,932,373 to Nagamine, et al. ("Nagamine").

In making the rejection, the Examiner suggests that regardless of the method used, the negative active materials of Nagamine and of Applicants' Claims 1-4 are the same, noting that Nagamine does not explicitly state that the intensity ratio is less than 0.2. However, Applicants submit that, as amended, the negative active material recited by independent Claims 1 and 3 is distinct from the negative active material disclosed by Nagamine. Specifically, the negative active material of amended independent Claims 1 and 3 has the organic-insoluble components removed before heat treating the remaining organic-soluble components. Applicants note that Nagamine does not teach or suggest the removal of such organic-insoluble components before heat treating the remaining organic-soluble components, and therefore, the end product of Nagamine is not the same as the end product of amended independent Claims 1 and 3.

Accordingly, Applicants respectfully request withdrawal of the rejection of independent Claims 1 and 3. Claims 2 and 4 respectively depend from Claims 1 and 3 and are not anticipated or obvious at least for the same reasons.

The Examiner rejects Claims 1-8 under 35 U.S.C. 102(e)/103(a) as being anticipated by and alternatively obvious over U.S. Patent No. 5,906,900 to Hayashi, et al. ("Hayashi"). In making the rejection, the Examiner relies on Hayashi to show that the claimed invention as a whole would have been obvious because both Hayashi and the claimed invention include carbon compounds made from the same material using the same process. The Examiner notes, however, that Hayashi does not teach an intensity ratio of less than 0.2.

In response, Applicants note that Hayashi fails to teach or suggest the removal of organic-insoluble components before heat treating the remaining organic-soluble components, as recited in Applicants' amended independent Claims 1, 3, and 5. Thus, the negative active material of Hayashi cannot be considered to be the same material as that recited in amended independent Claims 1, 3, and 5 since the negative active material of Hayashi does not have organic-insoluble components removed therefrom before heat treating the remaining organic-soluble components.

Regarding Claim 5, the Examiner suggests that Hayashi teaches removing volatile components from a carbonaceous material-organic substance-mixed slurry, which renders obvious the removal of volatile components as recited in Claim 5. However, Applicants submit that Hayashi teaches removal from a slurry, not from either a coal tar pitch or a petroleum pitch as recited in Applicants' Claim 5. Thus, the removal steps are not equivalent, and Applicants' removal steps should not be considered obvious over the removal step cited by the Examiner.

Accordingly, Applicants respectfully request withdrawal of the rejection of independent Claims 1, 3 and 5. Claims 2, 4, and 6-8 depend respectively from Claims 1, 3 and 5. Thus, the dependent claims are not anticipated or obvious at least for the same reasons as their respective independent claims.

The Examiner rejects Claims 5-8 under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 5,721,071 to Sonobe, et al. ("Sonobe"). Among other limitations, independent Claim 5 recites dissolving a coal tar pitch or petroleum pitch in an organic solvent to remove organic-insoluble components therefrom and to obtain organic-soluble components and thereafter heat treating the organic-soluble components. Applicants submit that at least these limitations are neither taught nor suggested by Sonobe.

In making the rejection, the Examiner relies on Sonobe to show that a carbonized mesophase bead material is obtained from the pitch and that the mesophase beads are recovered during the production process. The Examiner also notes that Sonobe teaches and suggests that impurities are removed from the pitch. In response, Applicants submit that Sonobe does not teach or suggest that the heat treatment step is implemented only upon the organic-soluble components

which are a result of dissolving the pitch in an organic solvent to remove organic-insoluble components therefrom, as recited by Applicants' amended independent Claim 5. Thus, Sonobe does not teach or suggest all of the limitations of amended independent Claim 5.

Accordingly, Applicants respectfully request withdrawal of amended independent Claim 5. Claims 6-8 depend from Claim 5 and are not obvious at least for the same reasons.

CONCLUSION

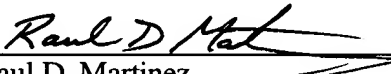
In view of the foregoing, it is believed that all claims now pending (1) are in proper form, (2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

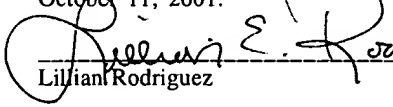
Dated: 10/11, 2001


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CERTIFICATE OF MAILING:

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail No **EL651846414US** addressed to: Assistant Commissioner for Patents, BOX CPA, Washington, D.C. 20231, on October 11, 2001.

 10-11-01
Lillian Rodriguez October 11, 2001

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend the claims as follows:

1 1. (Three Times Amended) A negative active material for a lithium secondary battery,
2 comprising a heat-treated graphite carbon material having an intensity ratio $I(110)/I(002)$ of an X-
3 ray diffraction peak intensity $I(002)$ at a (002) plane to an X-ray diffraction peak intensity $I(110)$ at
4 a (110) plane of less than 0.2, the negative active material prepared by

5 dissolving a coal tar pitch or a petroleum pitch in an organic solvent to remove organic-
6 insoluble [insoluble] components therefrom and to obtain organic-soluble components;

7 heat-treating the [pitch] organic-soluble components at a temperature in the range of 400 to
8 450 °C for 4 hours or more under an inert atmosphere to thereby produce at least 50 weight percent
9 of mesophase particles based on the pitch;

10 coking the pitch including mesophase particles;

11 carbonizing the coked pitch;

12 pulverizing the carbonized pitch; and

13 graphitizing the pulverized pitch.

1 3. (Three Times Amended) A lithium secondary battery comprising:
2 a negative electrode comprising a negative active material;
3 a positive electrode comprising a lithium containing material that can reversibly intercalate
4 and de-intercalate lithium ion; and
5 a non-aqueous electrolyte;
6 the negative active material comprising a heat-treated graphite carbon material having an
7 intensity ratio $I(110)/I(002)$ of an X-ray diffraction peak intensity $I(002)$ at a (002) plane to an X-
8 ray diffraction peak intensity $I(110)$ at a (110) plane of less than 0.2 and the negative active material
9 prepared by

10 dissolving a coal tar pitch or a petroleum pitch in an organic solvent to remove organic-
11 insoluble [insoluble] components therefrom and to obtain organic-soluble components;

12 heat-treating the [pitch] organic-soluble components at a temperature in the range of 400 to
13 450 °C for 4 hours or more under an inert atmosphere to thereby produce at least 50 weight percent
14 of mesophase particles based on the pitch;
15 coking the pitch including mesophase particles;
16 carbonizing the coked pitch;
17 pulverizing the carbonized pitch; and
18 graphitizing the pulverized pitch.

1 5. (Amended) A method of preparing a negative active material for a lithium secondary
2 battery, comprising the steps of:

3 dissolving a coal tar pitch or a petroleum pitch in an organic solvent to remove organic-
4 insoluble [insoluble] components therefrom and to obtain organic-soluble components;

5 heat-treating the [pitch] organic-soluble components at a temperature in the range of 400 to
6 450 °C for 4 hours or more under an inert atmosphere to thereby produce at least 50 weight percent
7 of mesophase particles based on the pitch;

8 coking the pitch including mesophase particles;

9 carbonizing the coked pitch;

10 pulverizing the carbonized pitch; and

11 graphitizing the pulverized pitch.